ORIGINAL COMMUNICATIONS

BLACK-WHITE DIFFERENCES IN MORTALITY IN IDIOPATHIC DILATED CARDIOMYOPATHY: THE WASHINGTON, DC, DILATED CARDIOMYOPATHY STUDY

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Racial, socioeconomic, and clinical factors were examined as predictors of survival in idiopathic dilated cardiomyopathy using cases from five Washington, DC-area hospitals. One hundred three (80.5%) of the patients were black and 25 (19.5%) were white. The black patients were less likely to have private health insurance, less educated on average, and more likely to have a household income of $15 000 or less ($P \leq .05$). No racial differences were found in cardiac medication usage, with the exception of beta blockers and antiarrhythmics. The cumulative survival among black patients at 12 and 24 months was 71.5% and 63.6%, respectively, as compared with 92.0% and 86.3% among whites. The 12-month survival of black patients with ventricular arrhythmias or an ejection fraction of less than 25% was particularly poor. Age, ventricular arrhythmias, ejection fraction, and cigarette usage were significant predictors of survival in univariate analysis using the proportional hazards model. The univariate association with black race was of borderline significance ($P \leq .07$). In multivariate analysis, age and race were statistically significant independent predictors of survival. A strong association with black race was observed with an estimated relative risk of mortality of 5.41 ($P \leq .02$) after adjustment for age, ejection fraction, ventricular arrhythmias, and educational attainment. Poorer survival among blacks may be caused by a greater severity of disease at the time of diagnosis or by racial differences in cardiac care, comorbid conditions, or biologic factors affecting survival. (*J Natl Med Assoc.* 1994;86:583-591.)

Key words • blacks • cardiac arrhythmias • congestive cardiomyopathy • hypertension • mortality • socioeconomic status

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Epidemiologic data from the United States indicate that idiopathic dilated cardiomyopathy occurs more frequently among blacks,[1,2] and that blacks may experience a greater mortality from this disease.[3,4] Many studies of factors associated with survival in idiopathic dilated cardiomyopathy have been carried

out in predominantly white patient populations,[5-13] and little is known about racial differences in mortality in idiopathic dilated cardiomyopathy. Moreover, many prognostic studies have been limited to selected patients undergoing cardiac evaluations at referral centers, and have not allowed for unbiased analyses of race, socioeconomic status, and other factors that may be associated with access to advanced diagnostic and treatment facilities.[14]

To learn more about the natural history of idiopathic dilated cardiomyopathy in blacks, we undertook a follow-up study of cases from five Washington, DC-area hospitals as part of a recent case-control study.[2,15] The aims of our study were to determine whether black patients with idiopathic dilated cardiomyopathy experience a greater mortality as compared with whites, and, if so, whether racial differences in mortality are accounted for by differences in socioeconomic factors or by previously identified prognostic factors.

METHODS

Case Ascertainment

Potential cases of dilated or unspecified cardiomyopathy (*International Classification of Diseases, Ninth Revision*, codes 425.4-425.9) were ascertained from the discharge listings of five metropolitan Washington, DC, hospitals for the period July 1, 1990, through February 29, 1992. A diverse sample of hospitals was selected in order to reduce potential problems associated with selection or referral bias. Four of the hospitals are located in Washington, DC, and the fifth is located in nearby Tacoma Park, Md. All of the hospitals have advanced facilities for the treatment and diagnosis of cardiac patients, including echocardiogram and cardiac catheterization laboratories, and three of the hospitals perform cardiac transplantations. Cases who were diagnosed prior to July 1, 1989, who were younger than 18 years of age, or who resided outside the Washington, DC, metropolitan area were excluded. The medical records of the remaining cases were abstracted for medical history and diagnostic information including the findings of cardiac catheterizations and noninvasive diagnostic tests, electrocardiograms, and cardiac medications at the time of discharge.

Diagnostic Criteria

Standardized diagnostic criteria were applied in this study.[1,2] All of the cases of idiopathic dilated cardiomyopathy had ventricular dilation and hypokinesis, with a left ventricular ejection fraction of less than 40%. If a directly calculated or noninvasively estimated ejection fraction was lacking, the director of the echocardiography laboratory at the participating hospital was asked to review the original record or forward a copy to one of the present investigators so that an estimate of the ejection fraction could be obtained. Cases with a history of known coronary artery disease, congenital heart disease, or significant valvular heart disease were excluded. Coronary artery disease was defined as evidence of stenosis of one or more main coronary arteries of 50% or greater, or a history of a myocardial infarction with substernal chest pain, recent electrocardiographic changes (Q waves, S-T segment changes), and a twofold or greater elevation of cardiac enzymes.

Patients with a history of heavy chronic alcohol abuse, defined as consumption of 8 fluid ounces (240 mL) or more of ethanol per day on average for a period of 6 months or longer, or treatment for alcoholism or alcohol withdrawal syndrome, were excluded as cases of alcoholic cardiomyopathy. Cases with a history of having received doxorubicin or daunorubicin during the year prior to the onset of symptoms of dilated cardiomyopathy, with a total dose greater than 350 mg/m^2 or pathological evidence of anthracycline cardiomyopathy, were considered to have cardiomyopathy secondary to chemotherapy. If a history of severe hyperthyroidism (thyroxine >13.5 mg/dL) or hypothyroidism (thyroid-stimulating hormone >7.0 or thyroxine <6.5 mg/dL) was present during the year prior to onset of symptoms of dilated cardiomyopathy, with improvement of the myocardial involvement following the treatment of the thyroid disease, the case was considered to be secondary to severe thyroid disease. Cases with known sarcoidosis and pathologic evidence of myocardial granulomas were excluded, as were the following:

- a history of pregnancy within 6 months of the onset of symptoms of dilated cardiomyopathy,
- radiation therapy to the chest,
- an infectious process with a fourfold or greater rise in antibody titer,
- human immunodeficiency virus seropositivity,
- hemochromatosis,
- pheochromocytoma,
- acromegaly,
- genetic storage or neuromuscular disease,
- connective tissue disease,
- amyloidosis,

- neoplastic heart disease,
- cardiac surgery, or
- penetrating trauma to the heart.

Subjects with a history of hypertension were not excluded if the criteria for dilated cardiomyopathy were otherwise met, as associations with hypertension were of interest in the present study.

Interviews

The cases were interviewed by telephone at the time of the case-control study using a structured questionnaire with predetermined prompts.[2,15] Surrogate interviews of a close family member were completed for those cases who were deceased or too ill to participate. The interview included questions about socioeconomic and demographic factors, history of hypertension, diabetes mellitus, and cigarette and alcohol consumption. The respondents were asked if the subjects had ever been told by a physician that they had diabetes or hypertension. Responses concerning consumption of beer, liquor, and wine were converted to fluid ounces of ethanol per month using a standard formula.[16] Quetelet index was computed using reported estimates of height and weight. The cases were recontacted approximately 1 year after the baseline interview to determine their vital status and to obtain information about health insurance coverage and referral for cardiac transplantation. In the event the patient was deceased, an attempt was made to obtain follow-up information from a close family member.

Statistical Analysis

Abstracted information about electrocardiographic findings was categorized as supraventricular arrhythmias (atrial fibrillation, atrial flutter, multifocal atrial tachycardia, atrial premature complexes, or sinus tachycardia), ventricular arrhythmias (sustained ventricular tachycardia, or multifocal or unifocal premature ventricular complexes), bundle branch block, left ventricular hypertrophy, and nonspecific ischemic changes (abnormal Q waves, poor R wave progression, or subendocardial ischemia). Recorded measurements of left ventricular ejection fraction obtained from contrast left ventriculogram reports, if available, were used in preference to recorded estimates from echocardiograms. Chi-squared tests and Fisher's exact test were applied to determine the statistical significance of associations between race and categorical variables. The prognostic significance of race and other factors was assessed using Kaplan-Meier product-limit analyses.[17] The log-rank test and the generalized Wilcoxon test were used to determine the statistical significance of differences in survival curves. Proportional hazard models were then fitted in a stepwise fashion to identify covariates independently predictive of survival.[18]

RESULTS

A total of 160 eligible cases of idiopathic dilated cardiomyopathy were ascertained from the five study hospitals with an overall chart retrieval rate of 95.1%. Of these, 150 patients were either black or white (non-Hispanic). A total of 22 cases were excluded from this analysis because the attending physician did not give permission to contact them (3), the respondent declined to take part in the initial interview (16), or they could not be traced (3), leaving a sample of 128 patients available for analysis. The nonrespondents and cases who could not be traced were similar to the other cases with respect to age, sex, race, recorded history of diabetes and hypertension, and major categories of electrocardiographic findings and cardiac medications at the time of discharge ($P>.05$ for each comparison). An exception was diuretic usage, which was more frequent among nonrespondents ($P<.01$). Sixteen (12.5%) of the cases had been reviewed histologically using cardiac tissue obtained through endomyocardial biopsy or postmortem examination.

Initial interviews were obtained for 122 (81.3%) of the cases after a period of 2 to 19 months following the date of initial hospitalization for dilated cardiomyopathy. Surrogate interviews of a close family member were necessary for 28 (23%) of the cases because of death or severe illness. Follow-up interviews were obtained for 100 (78.1%) of the cases after a period of 4 to 21 months following the date of the initial interview. The hospital discharge date corresponding to the time of first diagnosis was considered to be the baseline for this follow-up study. The total duration of follow-up since the initial hospitalization for dilated cardiomyopathy ranged up to 28 months (median: 13 months).

The ages of the cases at the time of discharge ranged from 22 to 88 years (mean: 59 years). The proportion of males was 53.1%. One hundred three (80.5%) of the cases were black and 25 (19.5%) were white. Thirty-three (32%) of the black cases and three (12%) of the white cases were deceased by the end of the follow-up period. Based on information obtained at the time of the follow-up interviews, only 1.3% (1 of 79) of the black

TABLE 1. CHARACTERISTICS OF CASES OF IDIOPATHIC DILATED CARDIOMYOPATHY BY RACE

Characteristic	Blacks No. (%)	Whites No. (%)	*P* Value
Age (years)			
≤49	27 (26.2)	4 (16.0)	
≥50 to ≤59	26 (25.2)	7 (28.0)	
≥60 to ≤69	24 (23.3)	9 (36.0)	
≥70	26 (25.2)	5 (20.0)	.49
Sex			
Male	52 (50.5)	16 (64.0)	
Female	51 (49.5)	9 (36.0)	.22
Educational attainment (years)			
≤11	34 (36.6)	4 (16.0)	
12 to 13	26 (28.0)	3 (12.0)	
14 to 15	18 (19.4)	8 (32.0)	
16 to 26	15 (16.1)	10 (40.0)	.01
Annual income			
≤$15 000	21 (27.6)	4 (16.7)	
>$15 000 to ≤$25 000	17 (22.4)	1 (4.2)	
>$25 000	38 (50.0)	19 (79.2)	.03
Private health insurance			
Yes	48 (60.8)	15 (88.2)	
No	31 (39.2)	2 (11.8)	.05
Medicaid			
Yes	15 (19.0)	3 (17.7)	
No	64 (81.0)	14 (82.4)	.90
Medicare			
Yes	22 (27.9)	4 (23.5)	
No	57 (72.2)	13 (76.5)	.72
Hospital			
A	10 (9.7)	8 (32.0)	
B	29 (28.2)	2 (8.0)	
C	7 (6.8)	1 (4.0)	
D	45 (43.7)	9 (36.0)	
E	12 (11.7)	5 (20.0)	.02
Ejection fraction			
<25%	48 (52.8)	12 (60.0)	
≥25% to <40%	43 (47.3)	8 (40.0)	.56
Coronary angiography			
Yes	42 (40.8)	16 (64.0)	
No	61 (59.2)	9 (36.0)	.04
Supraventricular arrhythmias			
Yes	55 (53.9)	11 (45.8)	
No	47 (46.1)	13 (54.2)	.48
Ventricular arrhythmias			
Yes	42 (41.2)	8 (33.3)	
No	60 (58.8)	16 (66.7)	.48
Bundle branch block			
Yes	37 (36.3)	13 (54.2)	
No	65 (63.7)	11 (45.8)	.11
Left ventricular hypertrophy			
Yes	52 (51.0)	6 (25.0)	
No	50 (49.0)	18 (75.0)	.02
Nonspecific ischemic changes			
Yes	17 (16.7)	4 (16.7)	
No	85 (83.3)	20 (83.3)	.99
Digoxin			
Yes	69 (67.7)	17 (68.0)	
No	33 (32.4)	8 (32.0)	.97
Diuretics			
Yes	77 (76.2)	18 (72.0)	
No	24 (23.8)	7 (28.0)	.66
Beta blockers			
Yes	3 (2.9)	4 (16.0)	
No	100 (97.1)	21 (84.0)	.03
Nitrates			
Yes	24 (23.5)	6 (24.0)	
No	78 (76.5)	19 (76.0)	.96
ACE inhibitors			
Yes	76 (75.3)	17 (68.0)	
No	25 (24.8)	8 (32.0)	.46
Calcium channel blockers			
Yes	15 (14.7)	2 (8.0)	
No	87 (85.3)	23 (92.0)	.38
Oral anticoagulants			
Yes	17 (16.5)	5 (20.0)	
No	86 (83.5)	20 (80.0)	.68
Antiarrhythmics			
Yes	9 (8.8)	7 (28.0)	
No	93 (91.2)	18 (72.0)	.01
Quetelet index			
≤2.35	15 (16.0)	8 (33.3)	
>2.35 to ≤2.66	19 (20.2)	7 (29.2)	
>2.66 to ≤3.10	25 (26.6)	6 (25.0)	
>3.10	35 (37.2)	3 (12.5)	.06
Hypertension			
Yes	73 (77.7)	14 (56.0)	
No	21 (22.3)	11 (44.0)	.03
Diabetes			
Yes	32 (33.0)	3 (12.0)	
No	65 (67.0)	22 (88.0)	.05
Ethanol consumption (fluid ounces per month)			
None	47 (57.3)	11 (44.0)	
>0 to <10	14 (17.1)	8 (32.0)	
≥10 to <25	10 (12.2)	1 (4.0)	
≥25 to ≤210	11 (13.4)	5 (20.0)	.21
Cigarettes per day			
None	39 (43.8)	9 (39.1)	
>0 to <20	23 (25.8)	7 (30.4)	
≥20 to <40	25 (28.1)	2 (8.7)	
≥40	2 (2.3)	5 (21.7)	.003

Abbreviations: ACE = angiotensin-converting enzyme.

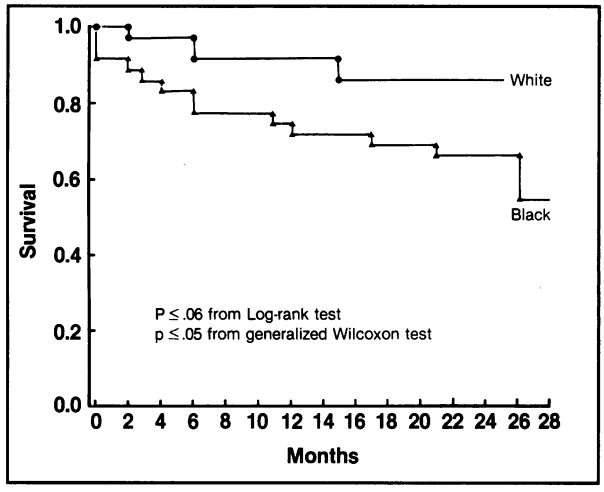

Figure 1. Survival curves of black (n = 103) and white (n = 25) patients with idiopathic dilated cardiomyopathy.

cases underwent cardiac transplantation compared with 12.5% (2 of 16) of the white cases ($P>.05$). An additional 11.4% (9 of 79) of the black cases were known to have been placed on a waiting list for a cardiac transplant compared with 6.3% (1 of 16) of the white cases.

Table 1 shows the frequency of a variety of socioeconomic and clinical characteristics among black and white patients with idiopathic dilated cardiomyopathy. The black patients were less educated on average, and more likely to have a household income of $15 000 or less. No statistically significant racial differences were noted in age, sex, or Medicare/Medicaid insurance coverage. However, fewer black cases had private health insurance as compared with whites. Clinically, black patients were less likely to have undergone coronary angiography and more likely to have electrocardiographic evidence of left ventricular hypertrophy. No statistically significant differences were found between race and treatment with digoxin, diuretics, nitrates, angiotensin-converting enzyme inhibitors, calcium channel blockers, or oral anticoagulants at the time of discharge. However, fewer black patients received beta blockers or antiarrhythmics. The black patients were more likely to have a history of hypertension, diabetes, and obesity, and less likely to be heavy cigarette smokers. Recorded data on duration of symptoms prior to diagnosis, New York Heart Association (NYHA) functional status, filling pressures, and cardiac morphologic measurements were insufficiently complete to allow for meaningful analyses.

The Kaplan-Meier survival curves for blacks and whites are presented in Figure 1. The cumulative survival among black patients at 12 and 24 months was 71.5% and 63.6%, respectively, compared with 92% and 86.3% among whites. Similar results were obtained when individuals with two or more major coronary artery disease risk factors (smoking, hypertension, or diabetes) who had not undergone angiography were excluded, in order to further rule out the possibility of ischemic cardiomyopathy (results not shown).

Further stratification by age, left ventricular ejection fraction, or ventricular arrhythmias revealed interactive effects with race (Figure 2). The 12-month survival of black patients with ventricular arrhythmias or an ejection fraction of less than 25% was particularly poor (less than 60% in both instances). Of those patients who were at least 60 years of age, the cumulative survival among black patients at 12 and 24 months was 58.8% and 42.1%, respectively, compared with 86.7% and 77% among older white patients. An interactive effect also was seen between race and educational attainment (Figure 2). The survival of white patients having less than 12 years of schooling was similar to that of blacks.

TABLE 2. UNIVARIATE ANALYSIS USING PROPORTIONAL HAZARDS MODEL

Variable	*P* Value
Older age	.005
Ventricular arrhythmias	.01
Lower ejection fraction	.03
Cigarette usage*	.04
Bundle branch block	.05
Calcium channel blockers*	.05
Black race	.07
Nonspecific ischemic changes	.09
Ethanol consumption*	.16
Hypertension	.18
Medicaid insurance	.20
Oral anticoagulants	.40
Medicare insurance	.43
Lower educational attainment*	.45
Private health insurance*	.47
Diabetes*	.49
Left ventricular hypertrophy*	.57
Supraventricular arrhythmias	.60
Antiarrhythmics	.70
ACE Inhibitors*	.76
Digoxin*	.79
Diuretics	.80
Lower annual income	.82
Nitrates	.84
Male gender*	.87
Higher Quetelet index	.89
Beta blockers*	.99

*Inverse association with mortality.

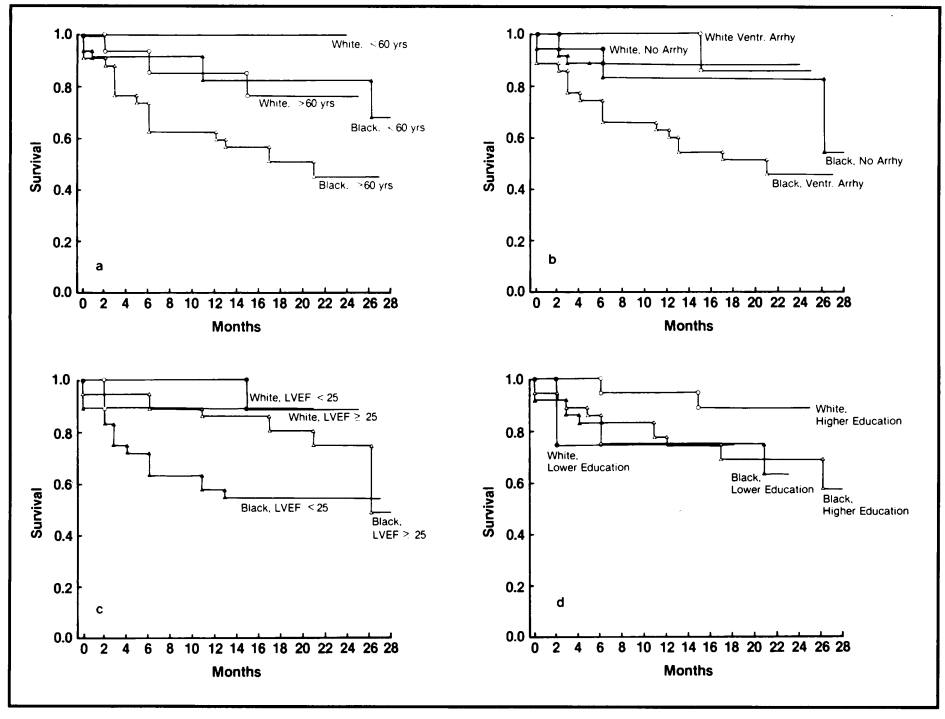

Figure 2. Survival curves of patients with idiopathic dilated cardiomyopathy by race and age (a), ventricular arrhythmia (b), ejection fraction (c), and educational attainment (d).

Univariate results from proportional hazards modeling of the data are summarized in Table 2. Older age, ventricular arrhythmias, and lower ejection fraction were inversely related to survival in univariate analysis. Contrary to expectation, cigarette smoking was positively related to survival in univariate analysis, which may be explained by uncontrolled confounding or changes in smoking status prior to diagnosis. The univariate associations with bundle branch block, calcium channel blockers, and black race were of borderline significance. Coronary angiography, which was performed less frequently among older persons and among blacks in this sample of patients (14), also was associated with survival in univariate analysis ($P \leq .003$). None of the other socioeconomic and clinical factors examined were significantly associated with survival.

In multivariate modeling of the data, only age and race were found to be statistically significant independent predictors of survival (Table 3). Cases who were at least 60 years of age had roughly a threefold increased risk of dying compared with those who were younger than 60 years of age. A strong association with black race was observed with an estimated relative risk of 5.41 (95% confidence interval [CI_{95}] = 1.2 to 23.6, $P \leq .02$), after adjustment for age, ejection fraction, ventricular arrhythmias, and educational attainment. The associations with ejection fraction, ventricular arrhythmias, and educational attainment were of borderline significance (Table 3). Similar results were obtained when ejection fraction was treated as a continuous variable (results not shown). Further adjustment for cigarette usage, bundle branch block, calcium channel blockers, nonspecific ischemic changes, hypertension, diabetes, or Quetelet index did not diminish the strong association with race. After further adjustment for coronary angiography (in addition to age, ejection fraction, ventricular arrhythmias, and educational attainment), the association with black race was of borderline significance ($P \leq .09$). The point estimate of the adjusted relative risk for black race was 3.8 (CI_{95} = 0.81 to 17.4), however, and angiography was not statistically associated with survival in multivariable analysis ($P \leq .12$).

DISCUSSION

Previous studies of the prognosis of idiopathic dilated cardiomyopathy patients have focused primarily on clinical, hemodynamic, and morphologic factors that may be associated with survival, including filling pressures, the ejection fraction and other measures of left ventricular performance, and electrocardiographic abnormalities such as complex ventricular arrhythmias.[19-22] The results of previous prognostic studies have not been entirely consistent, however, and important questions remain about the generalizability

TABLE 3. MULTIVARIABLE RESULTS FROM PROPORTIONAL HAZARDS MODEL

Covariate	Coefficient	Standard Error	*P* Value	Relative Risk
Age (≥60 versus <60 years)	1.09	0.46	.02	2.98
Black race	1.68	0.75	.02	5.41
Ejection fraction (<25 versus ≥25%)	0.53	0.41	.20	1.71
Ventricular arrhythmias	0.68	0.42	.11	1.98
Educational attainment (<14 versus ≥14 years)	0.56	0.39	.15	1.75

and reproducibility of some reported associations. For example, studies of highly selected patients referred for specialized cardiac evaluation and treatment may not provide results that are generalizable to unselected patient populations,[6] particularly when the sample has been limited to surviving patients who consented to undergo invasive diagnostic tests. The likelihood of selection biases may be greater when examining the prognostic significance of factors associated with access to health care, such as race and socioeconomic status. The approach taken in the present study to overcome this difficulty was to ascertain patients with probable idiopathic dilated cardiomyopathy from community, teaching, and private hospitals, and to include them in the survival analyses even if they had not undergone invasive diagnostic tests such as coronary angiography. Although some of the hospitals included in the present study do serve as referral centers, a diverse sample of hospitals was selected, and patients who resided outside the Washington, DC, metropolitan area were excluded. As a result, the case series reflects the racial and socioeconomic diversity of the target population. The survival of white patients in the present series was similar to that observed by Sugrue et al[6] in a population-based study from Olmstead County, Minnesota.

The results of this study suggest that black patients with idiopathic dilated cardiomyopathy are more likely to die in the first 24 months following diagnosis as compared with whites. This finding is consistent with epidemiologic evidence from the United States indicating that blacks experience a greater mortality from this disease.[3,4] The poorer survival among blacks may be due to a delay in diagnosis and greater severity of disease at the time of diagnosis, or to racial differences in cardiac care or patient compliance following the initial clinical presentation. In the present study, a lack of detailed information about the duration of symptoms, as recorded in the medical record at the time of initial hospitalization for dilated cardiomyopathy, precluded looking at black-white differences in disease duration in any systematic fashion. However, no statistically significant differences were observed among blacks and whites in either the frequency of ventricular arrhythmias or the severity of impairment in left ventricular performance (Table 1). No racial differences in cardiac medication usage were observed with the exception of antiarrhythmics and beta blockers. However, use of these medications was not found to be predictive of survival in this study (Table 2), and beta blockers were prescribed infrequently in both blacks and whites (Table 1). No inferences can be drawn from the results of this study about the efficacy of specific treatment regimens because of the nonrandomized observational design and the lack of information about patient compliance.

It was not feasible to examine racial differences in the length of time to cardiac transplantation in the present study because of the small number of patients who underwent transplantation. Nonetheless, our preliminary findings suggest there may be significant barriers to surgical intervention affording survival among black patients with idiopathic dilated cardiomyopathy. Follow-up of this case series is continuing, and it is possible that there will be adequate numbers of transplanted patients to examine this issue in the future.

The racial difference in survival was not diminished by adjustment for level of educational attainment, which may be associated with patient delays in seeking health care or poor patient compliance with treatment regimens. Although racial differences in comorbid conditions could account for the poorer survival of black patients with dilated cardiomyopathy, the association with black race persisted after adjustment for hypertension, diabetes, and Quetelet index, and these factors were not significantly associated with survival. Nevertheless, diabetes, hypertension, increased body mass, and electrocardiographic evidence of left ventricular hypertrophy were more frequent among blacks in this series of patients (Table 1).

With respect to limitations, we cannot rule out the possibility that some patients with ischemic cardiomy-

opathy were misclassified as having idiopathic dilated cardiomyopathy. Congestive heart failure patients with ischemic cardiomyopathy have been reported to have a poorer prognosis than those with idiopathic dilated cardiomyopathy,[23] and fewer blacks in this sample of patients had undergone coronary angiography to rule out coronary artery disease.[14] Nonetheless, the racial difference in survival persisted when individuals with two or more major coronary artery disease risk factors (such as smoking, hypertension, or diabetes) who had not undergone angiography were excluded.

Because recorded data on cardiac morphologic measurements and NYHA functional status were lacking in a sizable percentage of patients, we cannot determine whether the strong association between black race and survival would have been attenuated by adjustment for left ventricular dimensions, interventricular wall thickness, or functional status. Increased left ventricular wall thickness and cardiac hypertrophy, which reduces ventricular wall stress, may be associated with improved survival in idiopathic dilated cardiomyopathy.[24] New York Heart Association functional status has been found to be an important predictor of survival in idiopathic dilated cardiomyopathy.[25] The loss of patients to follow-up is a further potential source of bias. Information bias may have occurred as a result of inaccuracies in the reported information about annual income, educational attainment, height and weight, alcohol consumption, cigarette smoking, and history of diabetes and hypertension. In addition, there may have been limited statistical power for some subgroup analyses of interest.

CONCLUSION

Black patients with idiopathic dilated cardiomyopathy may be more likely to die in the first 2 years following diagnosis than whites, even after other factors related to survival in idiopathic dilated cardiomyopathy are taken into account, including age, ventricular arrhythmias, and left ventricular ejection fraction. The finding that black race may be an important prognostic factor in this disease, together with our earlier observation that blacks may have a greater risk of developing idiopathic dilated cardiomyopathy,[1,2,4] underscores the need for effective strategies for the primary, secondary, and tertiary prevention of premature disability and death from idiopathic dilated cardiomyopathy in blacks.[26,27] Further studies are needed to determine whether the poorer survival among blacks is caused by a delay in diagnosis or decreased compliance with treatment regimens, or to racial differences in cardiac care, comorbid conditions, or biologic factors affecting survival.

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